Physics 512 – Test 1-1 Review

Topics List

Lessons 1-15 covering the following:

- Distance and Displacement
- Velocity and Speed
- Acceleration
- Kinematics Equations
- Free-Fall Motion (Vertical Motion)
- Measurement Lab
- Truck Lab (Speed Lab)
- Acceleration Lab (Rolling Ball)
- Ticker Tape Lab (Vertical Motion)

Please be sure to study the following:

- Notes handouts: Look at all terms, definitions, example problems, and partner practice problems
- All other worksheets from classwork and homework
- Quiz – review the problems you lost points on
- Labs
- Online Homeworks

Concepts Review

1) What is the difference between distance and displacement? Give an example to illustrate this difference.

2) What is the difference between average speed and instantaneous speed?

3) What is the difference between speed, velocity, and acceleration?

4) In general, how can you tell by an object's velocity and acceleration if the object is speeding up or slowing down?

5) In each case, circle the right answer. Remember that going forward is positive and going backwards is negative.

a) An object is going forward and slowing down. The acceleration should be (negative/positive)

b) An object is traveling backwards and the acceleration points backwards. Therefore, the object is (speeding up/slowing down)

c) An object has a positive acceleration. The object's speed will increase if the velocity goes in the (same/opposite) direction as the acceleration.

6) An object is dropped from rest and is in free fall. Each second, what happens to

a) the objects velocity?

b) the object's acceleration?

c) the distance traveled by the object each second?

7) Write down all the kinematics formulas we discussed in this unit.

Practice Problems

1) Sally leaves her house and walks 2 km north to Billy's house. She then walks 3 km south to the store. Finally, she walks to meet her mom for lunch at Bob's café, which is 5 km north of the store.

a) What is the total distance traveled by Sally?

b) What is her total displacement?

c) If the trip took 3 hours, what was her average speed? What about her average velocity?

2) a) What is the acceleration of a cart if it starts from rest at the top of a hill and reaches the bottom of the hill with a speed of 9 m/s in 6 seconds?

b) What is the cart's average speed during the 6 seconds?

c) How far did the cart roll in those 6 seconds?

3) A rock is dropped off the edge of a cliff. It hits the ground 4 seconds later.

a) How fast is it going right before it hits the ground?

b) How tall is the cliff?

4) Jake is running east at 8 m/s and slows down to a velocity of 2 m/s east at a constant rate in 12 seconds.

a) What is the direction and magnitude of Jake's acceleration?

b) If Jake's final velocity were 2 m/s west, what would be the magnitude and direction of his acceleration?

5) A ball is thrown upwards from the ground with a speed of 40 m/s.

a) What is the direction and magnitude of the acceleration?

b) How long will it take the ball to come to rest?

c) What will the height of the ball above the ground be at this point?

6a) What is the final speed of a cart that begins with a velocity of +3.0 m/s if it accelerates at a rate of $+1.5\ m/s^2$ while traveling +25 m?

6b) How long does it take for an object to reach a velocity of 2.0 m/s north if it begins with a velocity of 8.0 m/s south and accelerations north at a rate of $4.0\ m/s^2$?

Physics 512 – Do Now

A turtle crawls 3 km north, 10 km east, then 5 km south. He does this all in 6 hours. What is the turtle's average speed? What is his average velocity?

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